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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/570,051	02/27/2006	Michihiro Yamagata	10873.1853USWO	3061
53148 7590 03/09/2010 HAMRE, SCHUMANN, MUELLER & LARSON P.C. P.O. BOX 2902 MINNEAPOLIS, MN 55402-0902			EXAMINER DINH, JACK	
			ART UNIT 2873	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/570,051	<b>Applicant(s)</b> YAMAGATA ET AL.	
	<b>Examiner</b> JACK DINH	<b>Art Unit</b> 2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 12/08/09.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-10, 14 and 15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 14 and 15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>DETAILED ACTION</u> .                  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-4, 6-9, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA - Specification) in view of Uchiyama et al. (US Patent 6,839,178)

Regarding claim 1, AAPA (figure 12 – paragraph 0006) discloses an imaging apparatus comprising an imaging device comprising a plurality of pixels **113a** having a photoelectric conversion function, and a microlens array **111** comprising a plurality of microlenses **111a** that form subject images on the plurality of pixels in the imaging device and are arranged in a matrix, wherein the microlens array comprises light-shield partitions **112a** in a lattice form between the microlenses that are adjacent to each other. AAPA does not disclose that the microlens array comprises grooves wherein the depth of the grooves is larger than a half of a thickness of the microlens array. Within the same field of endeavor, Uchiyama (figures 2A-2B) discloses a microlens array **105** comprises light-shielding grooves **102** in a lattice form between the microlenses that are adjacent to each other, wherein the depth of the grooves is larger than a half of a thickness of the microlens array. Therefore, it would have been obvious to one of ordinary

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skill in the art at the time the invention was made to provide a microlens array comprises light-shielding grooves in a lattice form between the microlenses that are adjacent to each other, wherein the depth of the grooves is larger than a half of a thickness of the microlens array, for the purpose of reducing cross talk and providing clear image.

Regarding claim 2, Uchiyama (figures 2A-2B; col. 8, lines 14-37) further discloses that the material of the microlens array comprises a light-transmitting resin.

Regarding claim 3, Uchiyama (figures 2A-2B; col. 8, lines 14-37) further discloses that the microlens array is a plano-convex lens array whose one surface is provided with the microlenses and whose other surface is provided with the grooves and faces the image device.

Regarding claim 4, Uchiyama (figures 2A-2B; col. 8, lines 14-37) further discloses that a light-absorbing material **102** is applied to lateral surfaces of the grooves.

Regarding claim 6, Uchiyama (figures 2A-2B; col. 8, lines 14-37) further discloses that the width of the grooves increases toward the imaging device.

Regarding claim 7, Uchiyama (figures 2A-2B; col. 8, lines 14-37) further discloses that a second material having a smaller light transmittance than a first material forming the microlens array is filled in the grooves.

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Regarding claim 8, Uchiyama (figures 2A-2B; col. 8, lines 14-37) further discloses that the second material comprises a material having a light-absorption function.

Regarding claim 9, AAPA in view of Uchiyama does not explicitly disclose that the second material has a larger refractive index than the first material. However, this would be obvious to one skilled in the art to avoid total-reflection from easily occurring. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a larger refractive index for the second material for the purpose of preventing stray light.

Regarding claim 14, Uchiyama (figures 2A-2B; col. 8, lines 14-37) further discloses that the grooves are smaller than a thickness of the microlens array.

Regarding claim 15, Uchiyama (figures 2A-2B; col. 8, lines 14-37) further discloses that the grooves are smaller than a thickness of the microlens array. AAPA in view of Uchiyama does not explicitly disclose that the depth of the grooves is 70% or less of the thickness of the microlens array. However, as shown in figure 2B, the thickness of the lens is the depth of the groove plus the height of the curve surface of the lens. In shallow-lens applications, it is normal that the depth of the grooves is 70% or less of the thickness of the microlens array. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the depth of the grooves to be 70% or less of the thickness of the microlens array for design purpose.

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2. Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA - Specification) in view of Uchiyama et al. (US Patent 6,839,178), as applied in claim 4, and further in view of Nishikawa (US Patent 6,304,384).

Regarding claim 5, AAPA in view of Uchiyama does not explicitly disclose that the light-absorbing material is black. Within the same field of endeavor, Nishikawa (col. 10, line 64) discloses the teaching of a black light-absorbing material. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use black for light-absorbing material for the purpose of maximizing the light-absorbing functionality since darker colors absorb more light.

Regarding claim 10, AAPA in view of Uchiyama does not explicitly disclose that the microlens is manufactured by a resin molding. Within the same field of endeavor, Nishikawa (figures 10A & 10B) discloses of a microlens array **230** manufactured by resin molding. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use black for light-absorbing material for the purpose of maximizing the light-absorbing functionality since darker colors absorb more light.

### ***Response to Arguments***

3. Applicant's arguments filed on 12/08/09 have been fully considered but they are not persuasive.

### **Drawing Objections**

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Correction has been made. Objection is withdrawn.

102 Rejections

Claim 13 is cancelled.

103 Rejections

Regarding claim 1, Applicants argue that nowhere does Uchiyama teach or suggest that the light absorption materials 102 are in a lattice form. The Examiner respectfully disagrees. Although the grooves do not have a reference number in Uchiyama's figures 2A and 2B, the grooves are clearly the spaces or boundaries in between the lenses 105 that are filled by the material 102. The grooves are provided near the boundary portions of the lens members 105 (col. 8, lines 14-37). Therefore, it is clear that the grooves are in a lattice form. Applicants further argue that AAPA and Uchiyama are unrelated arts. The Examiner respectfully disagrees. Both AAPA and Uchiyama are directed to microlenses used in optical applications. Since the optical characteristics of microlens are the same in both applications, they are deemed to be related arts.

Regarding claims 5 and 10, no further argument was provided.

***Conclusion***

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JACK DINH whose telephone number is (571)272-2327. The examiner can normally be reached on M-F (9:30 AM - 6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky L. Mack can be reached on 571-272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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/Jack Dinh/

Primary Examiner, Art Unit 2873

03/07/10